Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/78
FRANCE
February 1964
Original: FRENCH

Confidential until official release during Conference

Abstract

ESSOR, TEST REACTOR FOR THE HEAVY WATER PROJECTS DEVELOPED BY EURATOM

(Commissariat à l'Energie Atomique, France)

Essor is a trial reactor designed for specific tests on the heavy water reactor. Series studied by Euratom.

Its first job is connected with the Orgel project, where it will be used to test the channels (fuel elements and pressure tubes) and the behaviour of organic liquids as cooling fluids.

The reactor, heavy water-moderated, can test twelve channels grouped in a central zone, surrounded by a ring of booster fuel elements.

These booster elements consist of highly enriched uranium alloy fuel plates, cooled by forced circulation of heavy water.

The maximum thermal neutron flux in the central zone can reach 2.10^{14} n cm^{-2} s^{-1}

The experimental channels can be supplied by five cooling loops. In the first set-up three organic liquid loops will be installed.

That workshops adjoining the reactor enable the fuel elements and the pressure tubes to be examined and dismantled after irradiation. Research on a neutron distribution very similar to that of an Orgel type reactor, the means to carry on several simultaneous tests on the fuel elements and pressure tubes under conditions similar to real ones, a proportionate system for treating information, and numerous experimental facilities will make of Essor an indispensable techno-

Translation provided by courtesy of the submitting Government

logical research tool in the development of the Orgel project.

The general characteristics of the reactor are as follows :

Power of the "Orgel zone"	13 MWth
Power of the "booster zone"	26 MWth

The 12 Orgel elements in a square lattice with 25.4 cm spacing

The 16 booster elements in a ring of 59 cm radius

Height of the elements 150 cm.

The Orgel zone is designed for 0.76 tons of uranium carbide.

The booster zone will take 5.9 kg of U-235.

Specific power : Orgel zone : 25 MW/t (max), 17 MW/t (average)

booster zone : 65 kW/g U-235 (max), 5.1 kW/g (average)

Maximum power per channel : Orgel : 1.12 MW

booster : 1.83 MW

Irradiation dose foreseen : 5000 MW d/T.

Although the Orgel fuel element is designed in the form of a cluster of 7 uranium carbide pencils canned with S.A.P., the use of other fuel elements is planned (oxide, metal, etc).

Construction of the reactor, begun in August 1963, continues actively and a divergence should be possible towards the end of 1966.

This is an example of international cooperation within the framework of Euratom ; the G.A.A.A. and Interatom Group having undertaken all the studies, has been assigned the industrial architecture of this unit in association with Montecatini.